

Generation and Modulation of Electricity by Rate of Change of Magnetic Flux

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Abstract—The system mainly focuses on the basic principle of conversion of rotational kinetic energy into electricity. The empty axial of the train is converted into a non geared motor with the help of magnets and copper wire. The movement of train wheels causes the rate of change of magnetic flux linked with the coil via magnets to change, thus producing electricity. The free generated electricity can thus be stored or utilized at the very same moment by supplying both the electricity to the train or battery. The emf generated is then transmitted wirelessly through coil by magnetic flux wherein the two coils at resonance matched with same frequency are coupled, when the vicinity is disturbed. Aim is to transfer the generated flux at a distance, fair enough wirelessly. The system hence utilizes the otherwise wasted rotational energy, converts it into electricity and transfers it wirelessly thus reducing the energy crisis.

Keywords-Electromagnetic Induction; Free energy; Generation and modulation of electricity.

I. INTRODUCTION

Locomotive engines are replaced by means of the electric trains because of better performance of engines. Thus emphasize is to reduce the electricity requirement and thus increasing the efficiency.

This system is very simple and the main focus is to utilize the rotational kinetic energy wasted every second. It is no way similar to the existing system where alternator forms the base of conversion. It basically focuses on the main principle of conversion of electromagnetic induction. Hence idea of this system is to convert the axial of train into a dynamo or a non geared motor. [1]

The alternate construction of the shaft based system is simpler and easy to implement and it avoids separate constructional requirement of the generator set. On bogie assembly of the train coach. The v-belt axle pulley set is mounted separately over the drum of the alternator is used commonly have conventionally lot of problems during movement. [1]

After successfully generating electricity, normally the power is transmitted through wires. This idea to suppress the perilous usage of electrical connections which involve plenty of uncertainty in distinctly organizing them, Wireless Power Transmission system would completely abolish the dynamic high-tension power transmission cables, secondary devices between the power generating station and power receiving device and facilitates the interdependence of electrical generation plants on global scale.

Resonant coupling method through magnetic flux can be used for Wireless Power Transmission system. The cost for transmission and distribution will be reduced and the cost of

electrical energy for the consumers also would be abate. There will not be number of wires for power reception from the same power source. Only a single power source and power receptors circuits for in the range of coupling. The power could also be transmitted to the places where the wired transmission is not possible. But of course this is a future aspect.

The wireless power transmission will not only make the system more cheaper, but also less colossal and arduous.

The enthusiasm for wireless power comes from wires being incommensurate and sloppy. With the numerous number of mobile electronics that we use today, there is a great demand for accessibility in supervision of their power supplies. Wireless communication has made a massive development in the way we connect with communication devices.

II. LITERATURE SURVEY

Conversion and modulation is what the overall system about when added to transmission. The existing system so far had alternators used which obeyed the same principle, but the inculcation of alternators led to use of pulleys and belt system thus making the system more bulky and complicated, the presence of pulley led to loading problems thus reducing the output of the system. If implemented, due to the loading problem, this system could only be helpful in lighting up the front halogen of the trains. Also the implementation of alternator led to many losses. Hence need was to develop such a sorted system which avails all the benefits of the existing alternator system overcoming the drawbacks as well. The loading problem is the main concern with the existing system, additional requirements only add to the overall cost of the system. The previous system output was uncontrollable, because we couldn't modify the output as per requirement as the alternator is a closed assembly, but that is not the case with this system, we can easily modify the output of the system by just increasing the number of turns of the windings or flux linkage or by alternating the magnetic gap. This system allows us to do so as it is an open cased system. There are magnetic losses which will be incorporated with the same, but they are quite controllable. [2]

Hence this system is a way better and can prove beneficial over the existing system. The overall output can be controlled by the number of turns of copper coils and also the rate of change of magnetic flux. [2]

A. System Overview

Generation, modulation and Transmission forms the triangle of this system. It becomes an entirely generating system after the starting jerk. It simply means, train wheels will rotate so

will the magnets, hence producing energy, this energy is then utilized as needed or fed back to the engine, hence the engine thus utilizes this newly generated power for driving the load and continues to operate on the same, hence what it requires is the feed energy after which the system becomes self generating till the system comes to a halt or stops. The generated power can then be modulated and wirelessly transferred or utilized.

The overall working is schematically explained with the help of the block diagram shown in 'Fig 1'.

B. Working

The working is very simple, the axle of the train is empty, so this system inculcates two magnets parallel to the axle, in a sandwiched form, on the axle is wound a copper wire with a certain number of turns or thickness, over the rod (axle). This is nothing but an assembly of a dynamo. So because of this magnet - copper wire assembly, there is rate of change of magnetic flux associated with the coil, now when the train moves, the axle rotates or moves, hence the rate of change of magnetic flux linked with the copper wire or coil changes, due to this rate of change of magnetic flux, an emf is induced which later can be modulated and modified to generate electricity. While the predicated weight of this single system will not be more than 15-20 kg. So the system will not create any type of mechanical loading problem to main engine and to strength of axle. The performance of this is almost same as before. In a single compartment there are 4 axles and with each axle there is a generator so with a train of only 10-12 compartments can also produce sufficient electricity. This electricity can also be used in internal power requirement of the train especially in ac coaches. Most challenging problem for this system is to fit it beneath chassis. The trains are expected to run up to a maximum speed of approximately 110 - 125km/h in varying climatic conditions specifically throughout India. All components to be mounted on the coach under frame shall be designed to withstand service vibrations and buffing shocks and tension. With this technology the solution is more efficient and simple. [3]

Generation and modulation of electricity

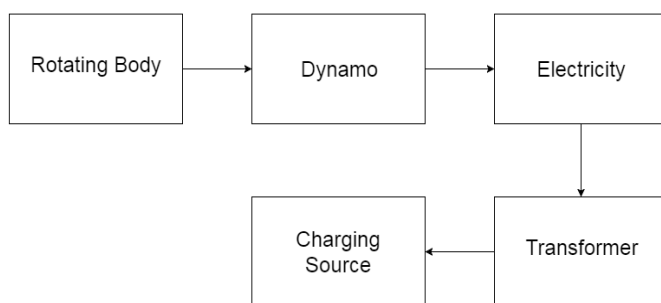


Fig.1 Block Diagram of Generation of Electricity

C. Applications

This mechanism provides a great benefit in charging of batteries and this is done at the expense of rotational kinetic energy. Generated flux can be directly supplied to the engine thereby reducing the need of power supply in other words it provides an upper hand in wireless charging of batteries and regenerative driving of automobiles.

CONCLUSION

The output is higher than the required voltage and the ripple content is less Than 3%.the efficiency of this mechanism is not less than 80%. The weight of the system is very less compared to separately balanced v-belt type and it is most economical. This kind of system when added to the light weight coach systems. It is more economical and robust in construction.

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